


What is claimed is:

1. A microfluidic optical switch comprising:
a fluid contained in a reservoir having a characteristic;
a first optical waveguide having an end located proximate said fluid;
at least one second optical waveguide having an end located proximate
said fluid; and
an actuator coupled to said fluid for changing the characteristic of the
fluid.
2. The optical switch of claim 1, wherein said microfluidic actuator
comprises an electrohydrodynamic actuator.
3. The optical switch of claim 1, wherein said characteristic is a deformable
interface formed on said fluid.
4. The optical switch of claim 1, wherein said fluid further comprises a
liquid/liquid interface.
5. The optical switch of claim 3, wherein said actuator controls the shape of
the deformable interface.
6. The optical switch of claim 1, wherein said characteristic is a controllable
refractive index gradient.
7. The optical switch of claim 1, wherein said fluid further comprises a
controllable refractive index gradient region that is controlled by an electric
signal.
8. The optical switch of claim 1, wherein said fluid further comprises a
controllable refractive index gradient region that is controlled by an incident
light.

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fluid  9. The optical switch of claim 1, wherein said reservoir is a tubule.

10. A method for operating a microfluidic optical switch comprising:
supplying light through a first waveguide to be incident upon a fluid;
altering a characteristic of the fluid; and
directing, in response to the characteristic alteration, the light into a
second waveguide.

fluid  11. The method of claim 10, wherein said characteristic is a position of a meniscus.

12. The method of claim 10, wherein said characteristic is a refractive index gradient.

13. The method of claim 12, further comprising:
controlling said controllable refractive index gradient using an electric signal.

14. The method of claim 12, further comprising:
controlling said controllable refractive index gradient using an incident light.

15. The method of claim 10, wherein said altering step further comprises:
activating an actuator to alter the characteristic.

16. The method of claim 15, wherein said actuator is an electrohydrodynamic actuator.

17. The method of claim 10, wherein said directing step further comprises:
directing said light into one of a plurality of waveguides.